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Barrus

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(54) **ADJUSTABLE, LIGHTWEIGHT, COLLAPSIBLE QUILTING APPARATUS AND METHODS FOR USING SAME**

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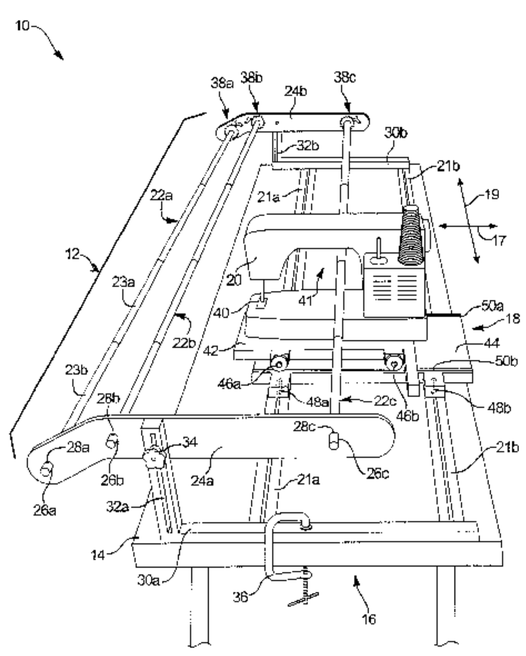
(57) **ABSTRACT**

A quilting apparatus and method for guiding a sewing machine relative to at least one layer of fabric is disclosed in one presently preferred embodiment including an adjustable quilting frame and a carriage assembly configured to mountably support the sewing machine having an arbitrary throat depth. Preferably, the quilting frame is mounted relative to a working surface and supportably retains one or more fabric layers in a substantially planar orientation to accommodate the sewing and stitching of patterns and/or designs into at least a portion of the fabric layers forming the quilt. The carriage assembly may be configured to transport the sewing machine in both lateral and longitudinal directions with respect to the quilting frame. Preferably, the carriage assembly includes a lower carriage component disposed on a first track configured to transport the sewing machine along the longitudinal dimension of the quilting frame and an upper carriage component disposed on a second track relative to the upper surface of the lower carriage component and configured to transport the sewing machine along the lateral dimension of the quilting frame. The quilting frame includes support members acting as spools in relation to the fabric layers and having locking mechanisms associated therewith for maintaining a sufficient amount of tension in the body of the fabric layers. Preferably, the support members are configured having an adjustable length to accommodate various sizes and dimensions of the fabric layers forming the quilt and to accommodate the arbitrary dimensions of the working surface upon which the quilting frame is mounted. The height of the quilting frame may also be adjusted with respect to the working surface by means of a height adjustment assembly.

36 Claims, 6 Drawing Sheets



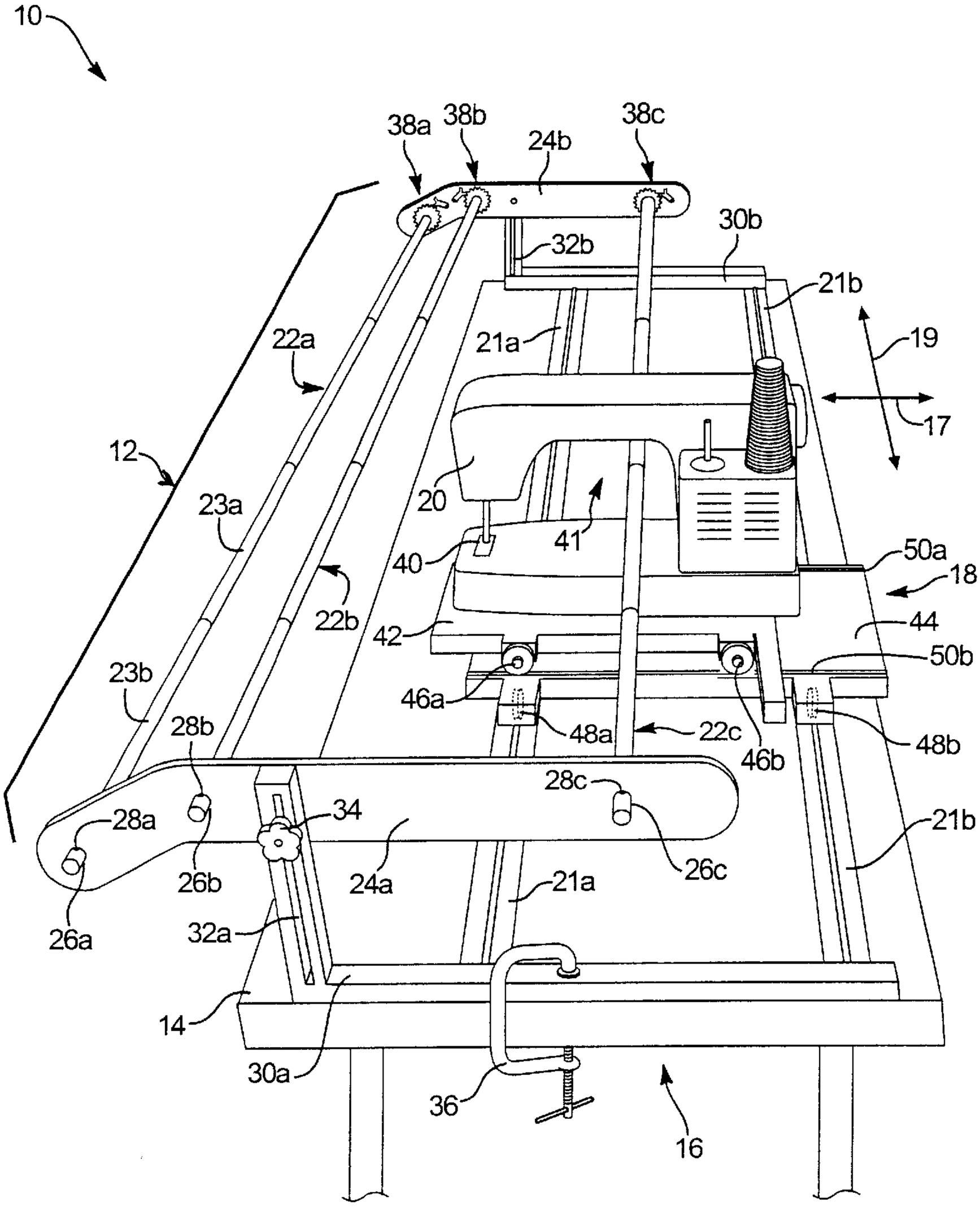

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FIG. 1

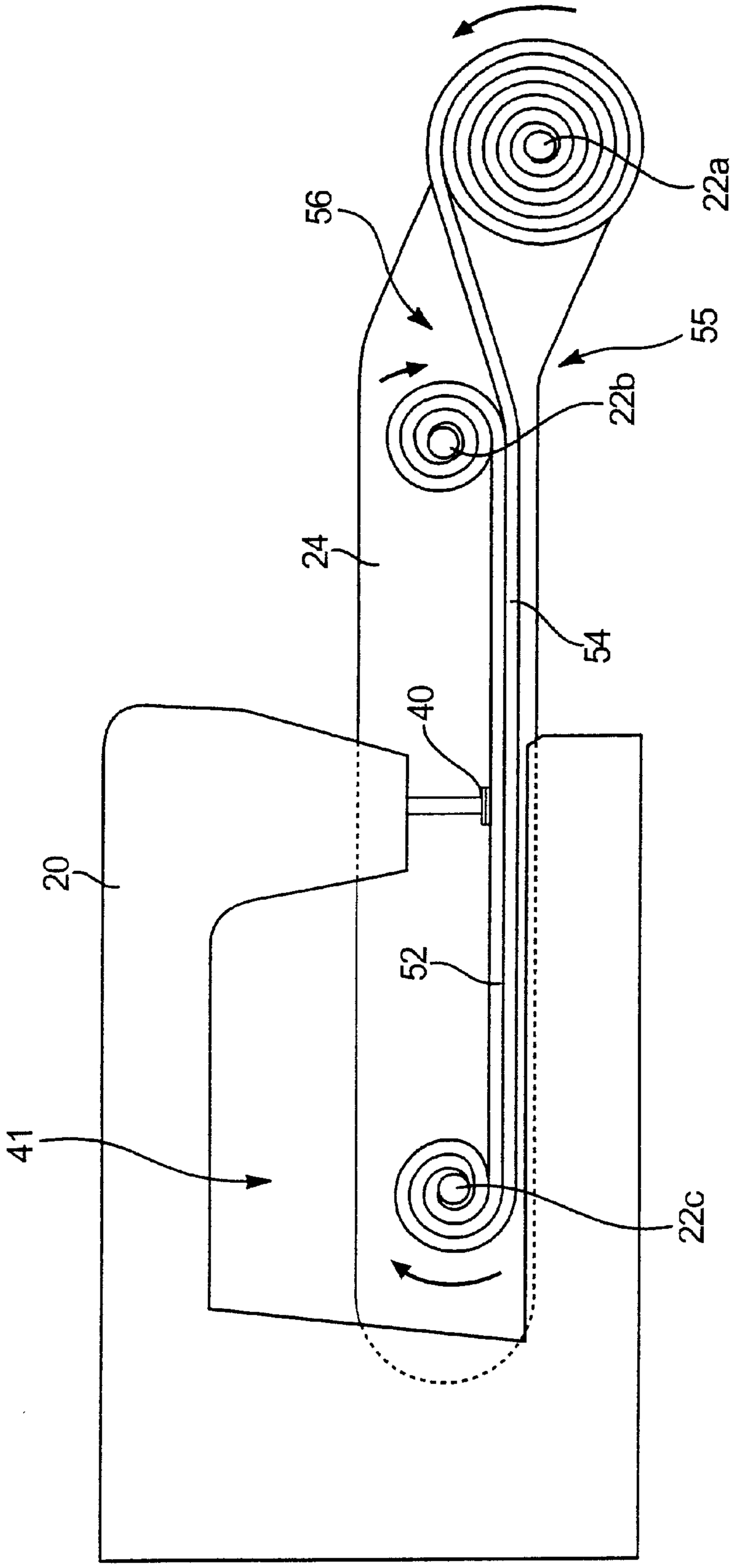

FIG. 2

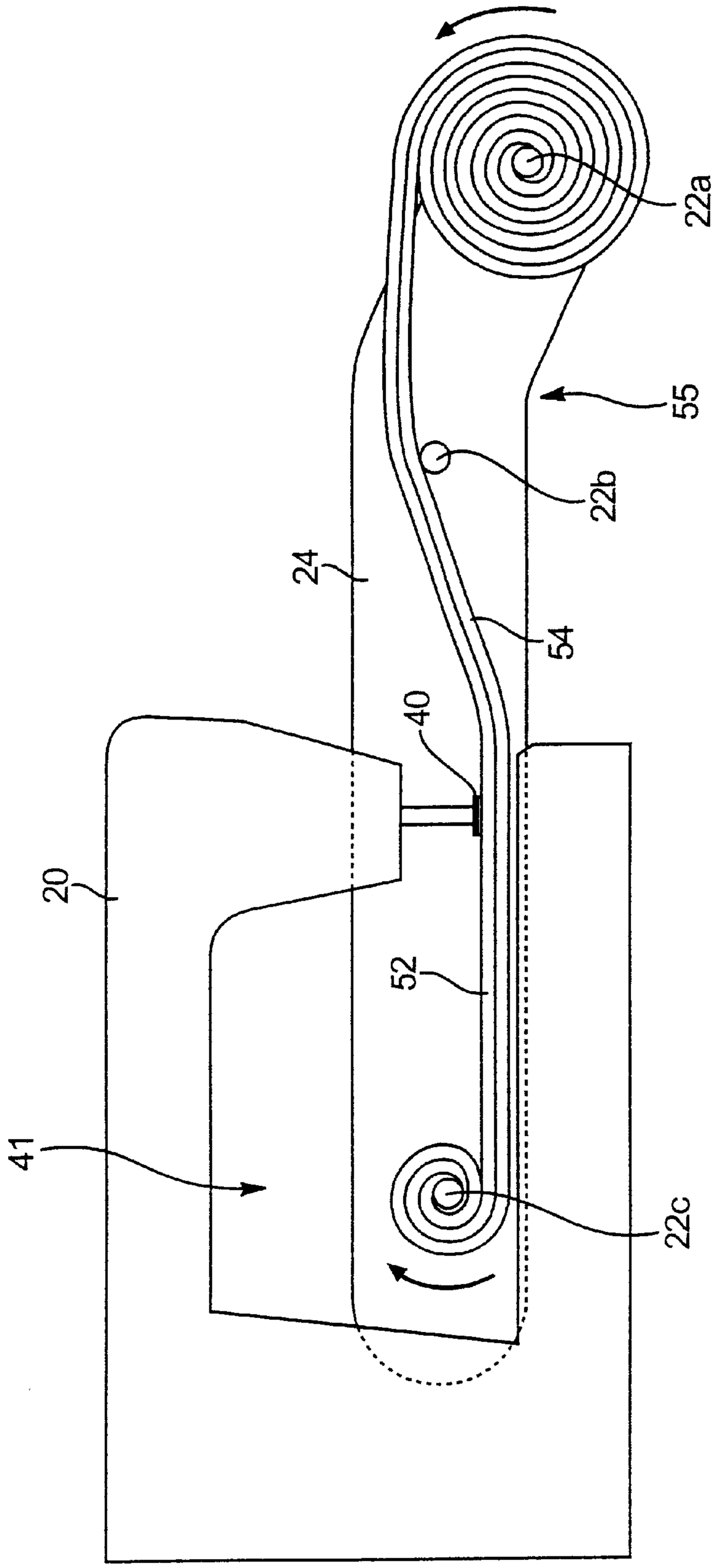

FIG. 3

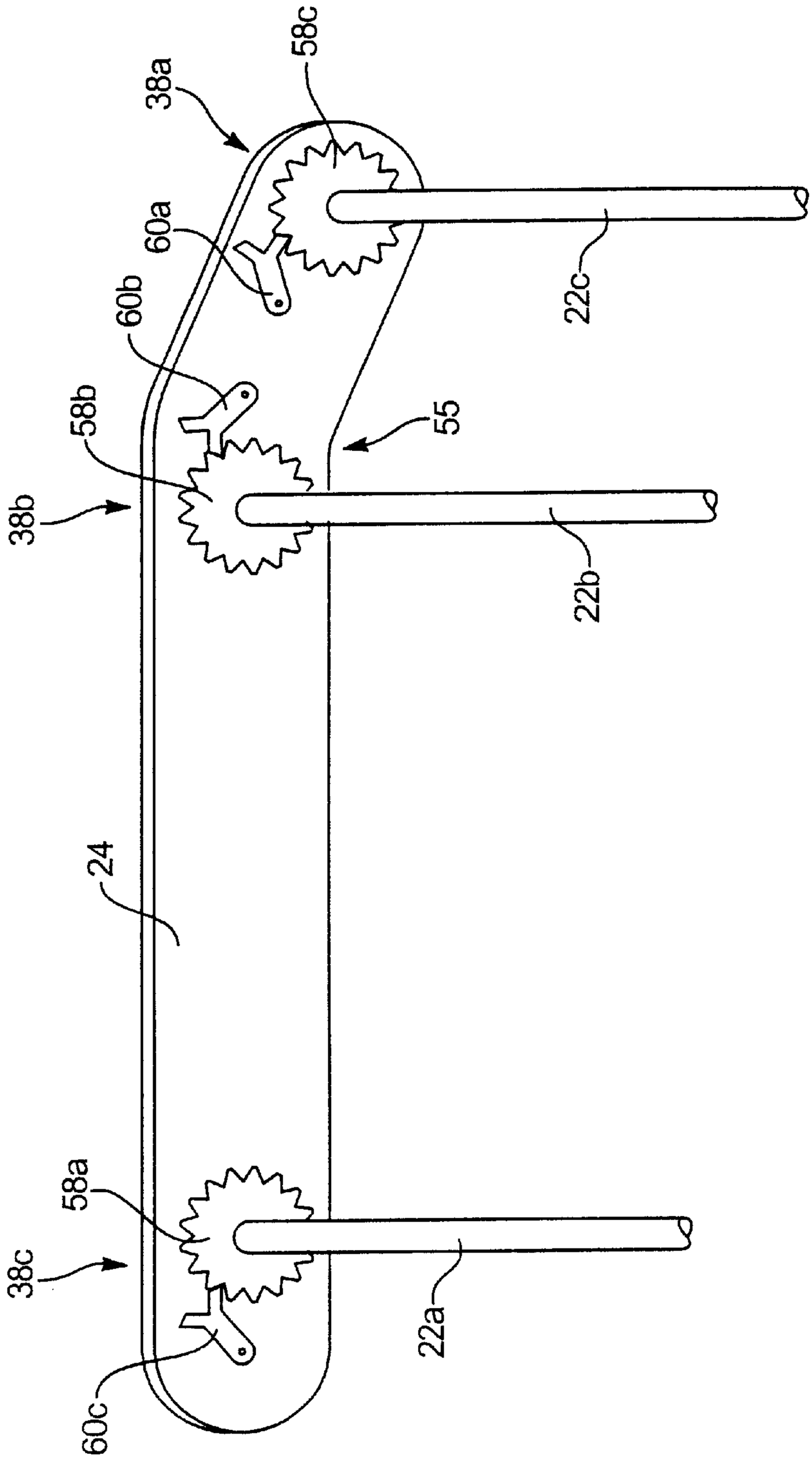

FIG. 4

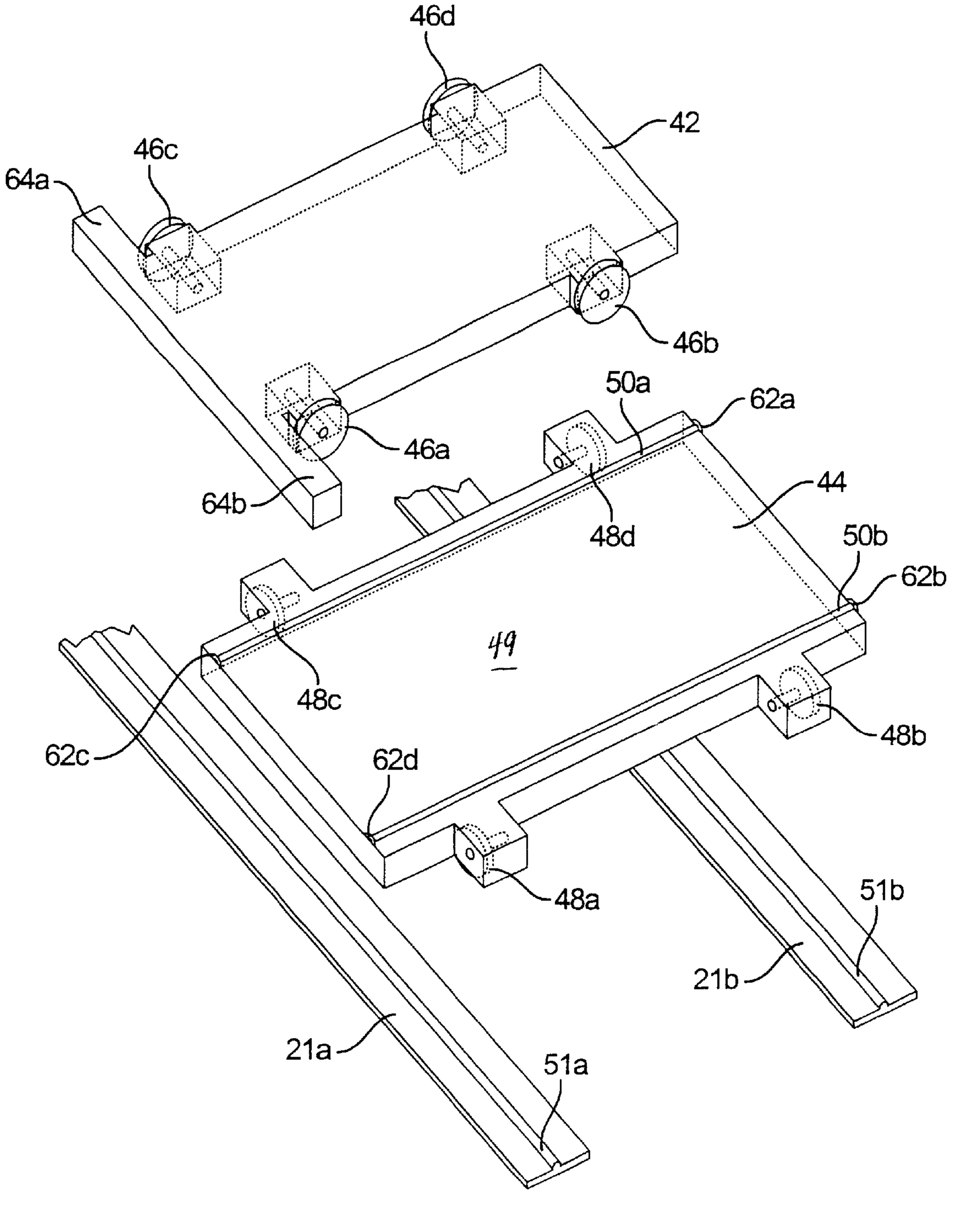
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FIG. 5

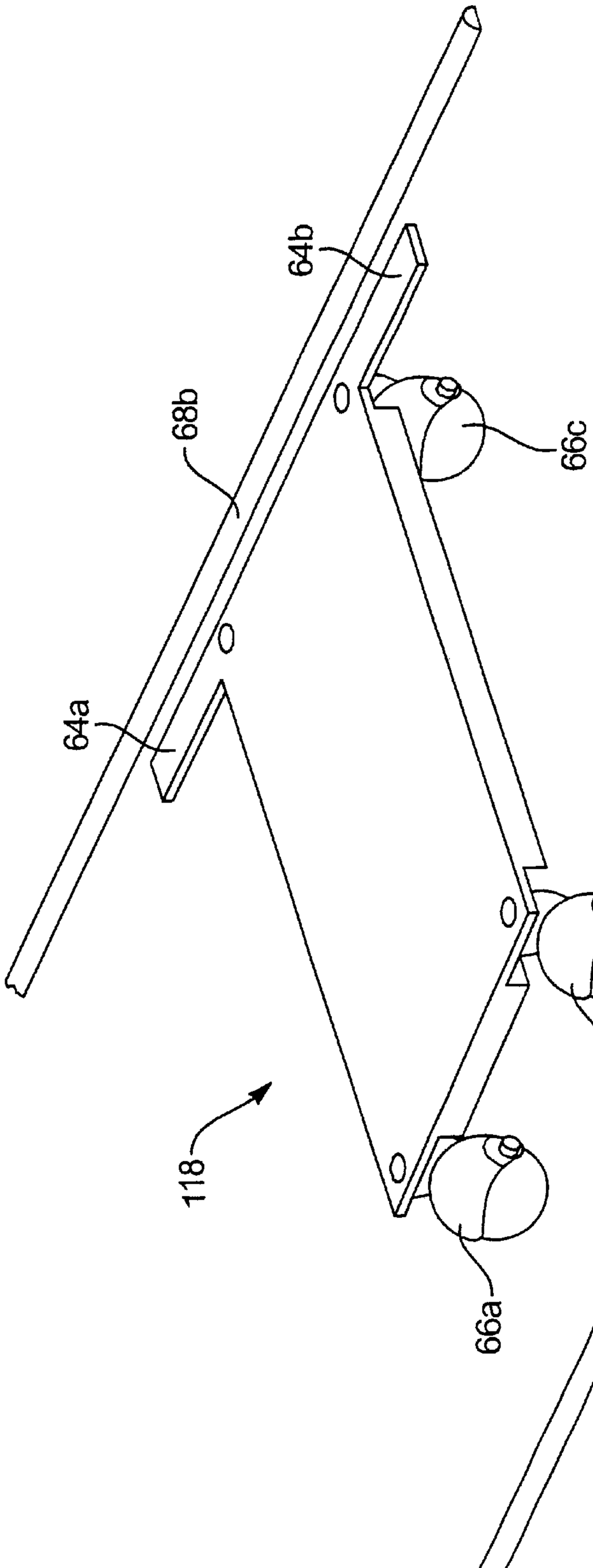


FIG. 6

ADJUSTABLE, LIGHTWEIGHT, COLLAPSIBLE QUILTING APPARATUS AND METHODS FOR USING SAME

BACKGROUND

1. The Field of the Invention

This invention relates to quilting devices and, more particularly, to novel apparatus and methods for quilting using sewing machines having an arbitrary throat depths, wherein the sewing machine is supportably positioned on a movable frame having a quilt engageably positioned in relation thereto.

2. The Background Art

Throughout American history, quilting has been a popular pastime. The craft today has experienced a resurgence in popularity and enjoys immense participation by hobbyists in quilting shows, magazines, newsletters, clubs, societies, and the like. Although traditional quilt making may be at the root of this resurgence, the development of modern textiles, machinery, and labor-saving sewing devices may be contributing to this resurgence, as many activities compete for the time of the average hobbyist or craftsperson.

Quilting typically involves stitching together multiple layers of fabric to form, in a manner of speaking, a new fabric. In some instances, quilting may include sewing together a myriad of smaller pieces of fabric to form a single composition fabric or material. A quilt typically includes an upper and lower layer of fabric having a layer of batting introduced therebetween for thickness, padding and/or warmth. As appreciated, quilts may be created in various shapes and sizes, such as for example, from small and ornamental, to those that cover large beds, or those that are mounted to decorate walls.

Designs or patterns are usually sewn or stitched into a quilt by hand or with a sewing machine, thereby adding an artistic element to the craft of quilt making. Some designs or patterns may be very elaborate, thus requiring a high degree of skill and dexterity on the part of the craftsperson or hobbyist. In some cases, sewing machines may be equipped with preprogrammed stitching patterns to assist in performing these tasks more accurately and with a greater degree of intricateness than quilting by hand. More importantly, extravagant quilting generally incorporates elaborate designs that may require many hours of work even by the most skilled craftsperson.

Due to the extensive time commitment realized by atypical quilter using hand-sewing methods to produce a quilt for a bed or for a decorative wall hanging, those skilled in the art developed industrial quilting assemblies for use in producing quilts in high quantities. These types of industrial quilting assemblies typically include heavy duty, bulky sewing machines disposed in a stationary position wherein the subject quilt, mounted on a quilting frame, is moved relative to the head of the sewing machine. A significant disadvantage with these types of prior art industrial quilting assemblies is the elaborate work area required to move and position the quilting frame supporting the layers of quilting material relative to the stationary head of the sewing machine. In particular, a very wide and long work space is generally required since the movement of the quilting frame relative to the head of the sewing machine may encompass twice the width and length of the support frame itself.

Household sewing machines have resulted in both tremendous time-savings and quality improvements over traditional hand-sewing methods. Nevertheless, manipulating large quilts with respect to stationary sewing machines is typically a cumbersome and laborious process. "Long arm" quilting machines were developed by those skilled in the art, in part, to address the problems associated with manipulating large quilts when stitching the multiple layers of the quilt together. In particular, instead of moving a quilting frame supporting a quilt with respect to a sewing machine, the quilting frame may be maintained stationary and the sewing machine may then be moved with respect to the width of the quilt. In order to accomplish this task successfully, a support frame is generally needed to maintain the quilt in a substantially planar configuration, and a carriage system may be needed to move the sewing machine with respect to the length and width of the quilt.

Unfortunately, "long arm" sewing machines of the prior art are usually complex in configuration, bulky, heavy, inflexible, and usually unaffordable to the typical consuming hobbyist or quilting craftsperson. As appreciated by those skilled in the art, commercial "long arm" sewing machines may cost upwards of several thousand dollars, making them generally out of reach and impractical to many quilting hobbyists. Moreover, specially designed "long arm" sewing machines and fixed frame assemblies are typically required to provide means for quilting using prior art quilting assemblies, thereby making a hobbyist's household sewing machine practically unusable in the task. In addition, many of the prior art quilting assemblies cannot perform desired stitching or sewing since the maneuverability of the head of the sewing machine is affected by its own mechanical and structural restrictions.

Conventional household sewing machines, which are generally intended to remain stationary when being used for sewing, typically include many of the stitching functions necessary for quilting, but may simply lack the wherewithal to be accurately movable with respect to the dimensional length and width of a quilt so as to accomplish the appropriate stitching and/or creative stitching designs desired by the user. In addition, quilting assemblies of the prior art require special tables or frames to support a sewing machine in relation thereto and to provide the appropriate tracking mechanisms necessary to manipulate the sewing machine in relation to the layers of material forming the quilt, thereby increasing the expense and bulkiness of these prior art systems and making ordinary tables unworkable in connection therewith.

In addition to the foregoing, work space is typically an issue to the average hobbyist or quilting craftsperson. Particularly, bulky "long arm" sewing machines usually require large work areas and may be unsightly and awkward if located in areas of an individual's home, such as a family room, den, dining room, bedroom, or living room. Moreover, finding sufficient space to store conventional prior art "long arm" sewing machines and quilting assemblies between uses typically poses a significant storage problem to the average hobbyist or craftsperson.

As appreciated, since quilts may take on a wide variety of dimensional sizes and shapes depending upon the use for which the quilt is being made, the fixed-size quilting assemblies of the prior art typically prove to be too large, bulky, and generally awkward for use with smaller quilts, while not being sufficiently expandable nor adjustable in order to accommodate a larger or, in the alternative, a smaller quilting project. Accordingly, the fixed-size quilting assemblies of the prior art are typically structurally fitted to support a particular sized quilt by means of a fixed length quilting support frame.

Space limitations that are imposed by a family room, den, dining room, bedroom or living room may further require a quilting assembly to be sufficiently adjustable to accommodate the dimensions of the available work space. Thus, fixed-size quilting assemblies of the prior art that are mounted to a support frame or structure (e.g., working surface or table having a fixed length and width) may be too cumbersome for the available workspace and thereby restrict the working area required for quilting.

The working components of prior art quilting assemblies have also been found be heavy, bulky in size, and generally awkward for the average hobbyist or craftsperson to handle or move. Therefore, a quilting apparatus having a functional and structural design that is adjustable in terms of size and configuration, collapsible for storage, sufficiently lightweight for easy portability, and which provides ease of handling are important features and characteristics to users of such quilting systems. Such a quilting apparatus and methods for using the same of which the above-referenced disadvantages of the prior art quilting assemblies are substantially eliminated is disclosed herein.

BRIEF SUMMARY AND OBJECTS OF THE INVENTION

In view of the foregoing, it is a primary object of the present invention to provide a quilting apparatus having many of the advantages of "long arm" quilting assemblies, while providing a greater degree of simplicity, affordability, and flexibility to a user.

It is also an object of the present invention to provide a quilting apparatus that makes use of a sewing machine of arbitrary throat depth being positionable on a carriage assembly and which is capable of providing the sewing or stitching mechanism for the quilt.

It is a further object of the present invention to provide a quilting apparatus having a quilting frame that is mountable to a wide variety of ordinary table tops having different dimensions, wherein the quilting frame is adjustable in its overall dimensional width and length with respect to the table top.

It is another object of the present invention to provide a quilting apparatus that is sufficiently lightweight for portability and collapsible for easy storage.

Consistent with the foregoing objects, and in accordance with the present invention as embodied and broadly described herein, a method and apparatus are disclosed in one presently preferred embodiment of the present invention as including a quilting frame and a sewing machine carriage assembly. The quilting frame may include two opposing end plates and one or more elongated support members disposed between the two opposing end plates. A locking assembly selectively engages at least one of the ends of the support member in such a manner so as to retain the fabric or material comprising the quilt sufficiently tensioned between each of the support members.

In one presently preferred embodiment of the present invention, the elongated support members may be configured having an extendable length or, in the alternative, a fixed length. Preferably, the support members of the quilting frame comprise one or more poles or spools. At least two, and preferably three or more support members supportably engage a portion of the length of the opposing end plates of the quilting frame at a spaced-apart relationship therebetween. The elongated support members are preferably adjustable in length in relation to the disposition of the opposing end plates to accommodate fabrics of various dimensions.

A carriage assembly may be used to maneuver a sewing machine with respect to the length and width of the quilt supportably mounted between the support members of the quilting frame. In one presently preferred embodiment, the carriage assembly may include upper and lower carriage components that are capable of manual and/or automated manipulation to facilitate the maneuverability of the sewing machine in both lateral and longitudinal directions respective to the quilting material. Tracks may be used to retain the upper and lower carriage components properly aligned in relation to each other. In addition, a length of track may be used to keep the carriage assembly properly aligned on a table top or other working surface.

A quilting apparatus made in accordance with one presently preferred embodiment of the present invention includes a quilting frame configured to selectively take up and pay out or deliver one or more pieces of fabric comprising a quilt, while maintaining the fabric in a substantially planar orientation defined by lateral and longitudinal dimensions. Consistent with the novel adjustable working components of the quilting apparatus of the present invention, the quilting frame may be mountable to any suitable working surface having an arbitrary length and providing a substantially smooth upper surface. In fact, the working surface may include a table top or any other surface of arbitrary length. The longitudinal dimension of the quilting frame may therefore be adjustable to the length of the working surface or table top, as desired.

More particularly, in one presently preferred embodiment of the present invention, the carriage assembly is configured to transport a sewing machine of arbitrary throat depth along the width of one or more pieces of fabric comprising a quilt, wherein the quilt has a length which supportably engages elongated support members of a quilting frame mounted in relation to a suitable working surface (e.g., table top). The sewing machine, as contemplated herein, may include a wide variety of conventional sewing machines currently available in the marketplace. Functionally, the carriage assembly provides means for moving the sewing machine with respect to the quilting fabric, along both the lateral and longitudinal dimensions thereof, for the purpose of applying stitching to at least a portion of the quilt.

In certain presently preferred embodiments, the carriage assembly includes an upper carriage component and a corresponding lower carriage component. The lower carriage component may be responsible for selectively transporting the sewing machine along the longitudinal dimension of the quilting frame. With respect thereto, the upper carriage component may preferably move along an upper surface of the lower carriage component and be configured to selectively transport the sewing machine along the lateral dimension of the quilting frame. As will be appreciated, in one presently preferred alternate embodiment of the present invention, the carriage assembly does not include upper and lower carriage components, but rather is formed as a single, unitary member, translatable with respect to both the later and longitudinal dimensions of the fabric comprising the quilt supportably engaging the elongated support members of the quilting frame.

A track may be mounted on the working surface or table top in order to restrict the movement of the lower carriage component in a predefined direction along the longitudinal dimension of the quilting frame. In one presently preferred embodiment of the present invention, the track may be provided in segments, thereby allowing a user to adjust the length of the track according to the corresponding width of the fabric comprising the quilt. In addition, a second track

may be formed on the upper surface of the lower carriage component to guide the upper carriage component in a predefined directional relation thereto. For example, the second track may be formed in such a manner so as to restrict the movement of the upper carriage to the direction defined by the lateral dimension of the quilting frame and may further comprise end stops or abutments to prevent the upper carriage component from becoming unexpectedly disengaged from its relation to the lower carriage component.

The first track may include a recess formed along at least a portion of the length of its upper surface. The recess being configured with a dimensional periphery sufficient to engageably retain a portion of a wheel or caster of the lower carriage assembly therein. Alternatively, a rib may be formed along at least a portion of the length of the upper surface of the first track. The rib being configured with a dimensional periphery sufficient to engageably retain a corresponding portion of a wheel or caster of the lower carriage assembly in relation thereto.

Preferably, wheels or casters may be incorporated into the structural design of the upper and lower carriage components to allow the carriage assembly to be translated in two dimensions. As discussed hereinabove, guides may be formed along the length of the track to retain the wheels or casters within a desired area or line of engagement, thus preventing the carriage assembly from becoming disengaged from its mountable relationship with the working surface or table top.

Similarly, the lower carriage assembly may include a recess formed along at least a portion of the length of its upper surface. The recess being configured with a dimensional periphery sufficient to engageably retain a portion of a wheel or caster of the upper carriage assembly therein. Alternatively, a rib may be formed along at least a portion of the length of the upper surface of the lower carriage assembly. The rib being configured with a dimensional periphery sufficient to engageably retain a corresponding portion of a wheel or caster of the upper carriage assembly in relation to the lower carriage assembly.

An apparatus and method in accordance with the present invention may also include at least two opposing end plates extending along the lateral dimension of the quilting frame. The two opposing end plates are preferably configured to engage the opposing ends of the support members, respectively, thus providing rotation points for the support members when taking up or paying out the supported fabric or material comprising the quilt. The positioning of the opposing end plates of the quilting frame further provides means for maintaining a constant spaced-apart relationship between each of the elongated support members.

The opposing end plates of the quilting frame may be supported by a height adjustment assembly. In one presently preferred embodiment of the present invention, the height adjustment assembly comprises at least one leg supporting each of the opposing end plates. The support legs may be formed having a length sufficient to facilitate an adjustment in the height of the quilting frame with respect the working surface (e.g., table top). Preferably, each support leg may be formed having a general L-shaped configuration. Each of the support legs may be structurally disposed in relation to at least a portion of the length of a respective end plate and may be secured to the working surface by means of a securing assembly. In certain embodiments, the securing assembly may include a clamp or bolt having arms that engage the support leg of the quilting frame and the working surface (e.g., table top).

Preferably, the support legs may be adjustably attached to the respective end plates of the quilting frame, thus permitting the quilting frame to be height adjusted with respect thereto. In certain preferred embodiments, each of the support legs may comprise a slotted opening formed along a portion of its length, thus allowing the corresponding end plate of the quilting frame to selectively slide along the length of the slotted opening. A friction knob or other suitable adjustment mechanism may be tightened manually in an effort to adjustably secure the opposing end plates of the quilting frame into position, with respect to the legs. Conversely, the adjustment mechanism may be loosened with respect to the engagement between the support leg and the end plate to facilitate sliding movement in relation to the slotted opening, thus providing means for height adjustment of the quilting frame in relation to the working surface or table top.

In one presently preferred embodiment of the present invention, the support members engage selective locking mechanisms to facilitate the support members being selectively locked into or released from their engagement with the two opposing end plates. In this regard, the support members and the opposing end plates may be easily assembled and/or disassembled, thus facilitating ease of storage, compactibility and portability.

The support members selectively engage the locking mechanism at one or both ends thereof. In one presently preferred embodiment of the present invention, the locking mechanism comprises a ratchet. The ratchet preferably comprises a gear configured to interlock with a locking member (e.g., pawl) disposed in a corresponding location along the length of one or both of the opposing end plates, thereby allowing the support members to rotate in relation to the opposing end plates in only a single direction. In this manner, tension may be selectively applied and maintained along the length of the quilt engaging the support members to discourage sagging or slack. As appreciated, the locking members may be selectively disengaged from its locking engagement with the respective gear of the support members to allow the support members to turn freely in either direction, thereby allowing a user to add or remove fabric along the length of the support members.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing and other objects and features of the present invention will become more fully apparent from the following description and appended claims, taken in conjunction with the accompanying drawings. Understanding that these drawings depict only typical embodiments of the invention and are, therefore, not to be considered limiting of its scope, the invention will be described with additional specificity and detail through use of the accompanying drawings in which:

FIG. **1** is a perspective view of one presently preferred embodiment of a quilting apparatus in accordance with the present invention;

FIG. **2** is side sectional view illustrating one presently preferred embodiment of the relationship of the support members of a quilting frame to a sewing machine mountably disposed in relation to a carriage assembly in accordance with one presently preferred embodiment of the present invention;

FIG. **3** is a side sectional view illustrating an alternative presently preferred embodiment of the relationship of the support members of a quilting frame to a sewing machine mountably disposed in relation to a carriage assembly;

FIG. **4** is a perspective view of one presently preferred embodiment of a locking mechanism for retaining proper tension along the length of the quilt;

FIG. **5** is a perspective view of one presently preferred embodiment of a carriage assembly illustrating the structural relationship of an upper carriage component, a lower carriage component and a first and second track providing means for assisting with the maneuverability of the carriage assembly relative to a quilting frame; and

FIG. **6** is a perspective view of one presently preferred alternative embodiment of a carriage assembly having casters adapted in relation thereto to facilitate the maneuverability of the carriage assembly relative to a quilting frame.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

It will be readily understood that the components of the present invention, as generally described and illustrated in the Figures herein, could be arranged and designed in a wide variety of different configurations. Thus, the following more detailed description of the embodiments of the system and method of the present invention, as represented in FIGS. **1** through **6**, is not intended to limit the scope of the invention, as claimed, but is merely representative of the presently preferred embodiments of the invention.

The presently preferred embodiments of the invention will be best understood by reference to the drawings, wherein like parts are designated by like numerals throughout.

One presently preferred embodiment of quilting apparatus of the present invention, designated generally at **10**, is best illustrated in FIGS. **1** and **2**. As shown, the quilting apparatus **10** includes a quilting frame **12** and a carriage assembly **18** configured to mountably support a sewing machine **20** having an arbitrary throat depth **41**. Preferably, the quilting frame **12** is mounted relative to a working surface **14** and supportably retains one or more layers of fabric in a substantially planar orientation to accommodate sewing and stitching by the sewing machine **20**. The carriage assembly **18** may be configured to transport the sewing machine **20** in both lateral and longitudinal directions **17**, **19** with respect to the disposition of the fabric relative to the quilting frame **12**. The maneuverability of the carriage assembly **18** relative to the length of the fabric forming the quilt provides a means for stitching patterns and/or designs into at least a portion of the body of the quilt.

A sufficient amount of tension may be applied to the fabric supported by the quilting frame **12** in an effort to facilitate proper alignment between the fabric to be sewn and stitched together to form a quilt having a desired size and shape. Preferably, the height of the quilting frame **12** may be adjusted with respect to the working surface **14** (e.g., table top) by means of a height adjustment assembly **16**. In one presently preferred embodiment, the height adjustment assembly **16** comprises at least one support leg **30**, a slotted opening formed in the length of the support leg **30**, and an adjustable mechanism **34** that selectively engages the support leg **30** and the quilting frame **12** in a secure position relative to each other.

In one presently preferred embodiment of the present invention, the quilting frame **12** may comprise at least one elongated support member **22** and two opposing end plates **24**. Preferably, two or more support members **22***a*, **22***b*, **22***c* are engageably disposed in relation to the opposing end plates **24***a*, **24***b*. The elongated support members **22***a*, **22***b*, **22***c* may comprise poles which act as spools for supportably engaging a length of the fabric comprising the quilt. Structurally, a first support member **22***a* may act as a spool for a lower layer of fabric, while a second support member **22***b* may act as a spool for an upper layer of fabric, as best shown in FIG. **2**. One or more layers of padding or batting (not shown) may be introduced or fed between the first and second support members **22***a*, **22***b* for the purpose of inserting the same between the upper and lower layers of the fabric which comprises the quilt. Specifically, a portion of the length of the quilt may be selectively payed out or delivered by the first and second support members **22***a*, **22***b* which act as spools to a third support member **22***c* whereupon the finished portion of the quilt may be stored.

Referring back to FIG. **1**, the two opposing end plates **24***a*, **24***b* of the quilting frame **12** may be configured to supportably retain opposing ends of the support members **22***a*, **22***b*, **22***c*, respectively. In one presently preferred embodiment of the present invention, the opposing end plates **24***a*, **24***b* of the quilting frame **12** may be formed of a sufficiently sturdy material. For example, the opposing end plates **24** may be formed of metal, wood, ceramic, fiberglass, graphite, any of numerous organic, synthetic or processed materials that are mostly thermoplastic or thermosetting polymers of high molecular weight, with or without additive, such as, plasticizers, auto oxidants, extenders, colorants, ultraviolet light stabilizers, or fillers, which can be shaped, molded, cast, extruded, drawn, foamed or laminated into objects, films, or filament, or any other composite materials or combinations thereof which are consistent with the spirit and scope of the present invention.

Receiving apertures **28***a*, **28***b*, **28***c* are preferably formed along the length of each of the end plates **24***a*, **24***b*. The receiving apertures **28***a*, **28***b*, **28***c* may also be disposed in a spaced-apart relationship to each other to provide a corresponding displacement between each of the support members **22***a*, **22***b*, **22***c*. The receiving apertures **28***a*, **28***b*, **28***c* are preferably configured having an internal periphery sufficient to receive an opposing end of a support member **22** and, accordingly, to provide a point of rotation for the engaging support member to selectively rotate in relation thereto.

A retention mechanism **28***a*, **28***b*, **28***c*, such as a biased locking pin, may be formed at the opposing ends of each of the support members **22***a*, **22***b*, **22***c*, respectively, to provide a means for selectively securing an engaging relationship between the support members **22** and the opposing end plates **24**. Accordingly, this structural arrangement and design between the support members **22** and the opposing end plates **24** thereby allows each of the support members **22** to be easily assembled or disassembled from its engagement with the receiving apertures **26** of the opposing end plates **24**, independent of each other, and collapsed for storage and ease of portability.

In one presently preferred embodiment of the present invention, the support members **22***a*, **22***b*, **22***c* may be formed of a sufficiently rigid material. For example, the support members **22***a*, **22***b*, **22***c* may be formed of metal, wood, ceramic, fiberglass, graphite, any of numerous organic, synthetic or processed materials that are mostly thermoplastic or thermosetting polymers of high molecular weight, with or without additive, such as, plasticizers, auto oxidants, extenders, colorants, ultraviolet light stabilizers, or fillers, which can be shaped, molded, cast, extruded, drawn, foamed or laminated into objects, films, or filament, or any other composite materials or combinations thereof which are consistent with the spirit and scope of the present invention. In addition, the elongated support members **22***a*, **22***b*, **22***c* may be configured having an extendable length.

Accordingly, the effective length of the support members **22***a*, **22***b*, **22***c* may be extendable, so that the quilting frame **12** may accommodate fabrics of various dimensions and be mounted on a working surface **14** having an arbitrary length. For example, the support members **22***a*, **22***b*, **22***c* may be telescopic, such as having telescopic sections **23***a*, **23***b*, or may simply have segments **23***a*, **23***b* which may be added or removed to increase and/or decrease the effective length of the support members **22***a*, **22***b*, **22***c*, as needed. In operational design, the support members **22***a*, **22***b*, **22***c* which are telescopic or provided in segments **23***a*, **23***b* may be collapsible and easily stored. As will be appreciated by those skilled in the art, the support members **22***a*, **22***b*, **22***c* engaging the opposing end plates **24***a*, **24***b* may, alternatively, be formed having a fixed length, if desired.

In one presently preferred embodiment of the present invention, the support members **22***a*, **22***b*, **22***c* engage selective locking mechanisms **38***a*, **38***b*, **38***c*, respectively, to facilitate the support members being selectively locked into or released from their engagement with the two opposing end plates **24***a*, **24***b*. In this regard, the support members **22***a*, **22***b*, **22***c* and the opposing end plates **24***a*, **24***b* may be easily assembled and/or disassembled to facilitate ease of storage, compactibility and portability.

The support members **22***a*, **22***b*, **22***c* may selectively engage the locking mechanism **38***a*, **38***b*, **38***c* at one or both ends thereof. In one presently preferred embodiment of the present invention, the locking mechanism **38***a*, **38***b*, **38***c* comprises a ratchet. As best shown in FIG. **4**, the ratchet preferably comprises a gear **58** configured to interlock with a locking member **60** (e.g., pawl) disposed in a corresponding location along the length of one or both of the opposing end plates **24***a*, **24***b*, thereby allowing the support members **22***a*, **22***b*, **22***c* to rotate in relation to the opposing end plates **24***a*, **24***b* in only a single direction. In this manner, tension may be selectively applied and maintained along the length of the fabric engaging the support members **22***a*, **22***b*, **22***c* in an effort to discourage sagging or slack in the quilt. As appreciated, the locking members **39** may be selectively disengaged from their locking engagement with a respective gear **58** of each of the support members **22***a*, **22***b*, **22***c* in order to allow the support members to turn freely in either direction. In this regard, fabric may be added or removed along the length of the support members **22***a*, **22***b*, **22***c*.

Referring now to FIG. **2**, in one presently preferred embodiment of the present invention, the quilting apparatus **10** may store an upper fabric layer **52** of the quilt on the support member **22***b* and a lower fabric layer **54** of the quilt on the support member **22***a*. A portion of batting, filling or padding may also be fed in at an entry point **56** disposed between the upper and lower fabric layers **52**, **54**. In certain other embodiments, a portion of batting, filling or padding may be stored on a spool and selectively supplied between the upper and lower fabric layers **52**, **54** of the quilt at the entry point **56**. In other instances, a portion of batting, filling or padding may be stored together with the upper and lower layers **52**, **54** of the quilt on either or both of the support members **22***a*, **22***b*.

In preferred operation, both the upper and lower fabric layers **52**, **54** of the quilt are sewn or stitched by the needle of the sewing machine **20** mounted on the carriage assembly **18** and subsequently rotatably positioned for storage on the support member **22***c*. As best shown in FIG. **1**, the support member **22***c* that preferably receives the quilted upper and lower fabric layers **52**, **54** may pass through the length of the throat depth **41** of the sewing machine **20**. In this regard, the upper and lower fabric layers **52**, **54** may be moved from their supportable engagement with the support members **22***a*, **22***b* to the support member **22***c*.

Referring now to FIG. **3**, in another presently preferred embodiment of the present invention, the upper and lower fabric layers **52**, **54** of the quilt may be selectively stored on a single support member **22***a*. Specifically, this may include the upper and lower fabric layers **52**, **54** of the quilt and any material inserted therebetween (e.g., batting, filling or padding). In certain instances, the fabric layers **52**, **54** may be fed above or below the relative disposition of the support pole **22***b* according to the amount of material on the support pole **22***a* and in such manner so as to maintain alignment of the fabric layers **52**, **54** in relation to the needle or foot **40** of the sewing machine **20**.

In general operation, the support members **22***a*, **22***b* may be used in a variety of ways to accommodate movement of the upper and lower fabric layers **52**, **54** of the quilt according to the nature of a project, including the amount of fabric being used, if the layers are separate or already together, and so forth. Referring to FIG. **4**, an angular bend **55** may also be incorporated into either end of the opposing end plates **24***a*, **24***b* to ease the feeding of the fabric layer **54** through the throat depth **41** of the sewing machine **20**, especially in cases where a large roll of fabric layers **52**, **54**, and possibly batting, are retained in selective engagement along the length of the support member **22***a*. Thus, the various structural components of the quilting apparatus **10** of the present invention provide a degree of versatility to a user.

Referring back to FIG. **1**, the opposing end plates **24***a*, **24***b* of the quilting frame **12** may be supported by a height adjustment assembly **16**. In one presently preferred embodiment of the present invention, the height adjustment assembly **16** comprises at least one leg **30***a*, **30***b* supporting each of the opposing end plates **24***a*, **24***b*. The support legs **30***a*, **30***b* may be formed having a length sufficient to facilitate an adjustment in the height of the quilting frame **12** with respect the working surface (e.g., table top) **14**. Preferably, each support leg **30** may be formed having a general L-shaped configuration. In addition, each of the support legs **30**, **30***b* may be structurally disposed in relation to at least a portion of the length of a respective end plate **24***a*, **24***b* and may be secured to the working surface **14** by means of a securing assembly **36**. In certain presently preferred embodiments, the securing assembly **36** may include a clamp or bolt having arms that engage the working surface (e.g., table top) **14** and the support legs **30***a*, **30***b* which supportably engage the opposing end plates **24***a*, **24***b* of the quilting frame **12**. Preferably, the support legs **30***a*, **30***b* may be adjustably attached to the respective end plates **24***a*, **24***b* of the quilting frame **12**, thus permitting the quilting frame to be height adjusted with respect thereto.

In one presently preferred embodiment of the present invention, each of the support legs **30***a*, **30***b* may comprise a slotted opening **32***a*, **32***b* formed along a portion of its length, thus allowing the corresponding end plate **24***a*, **24***b* of the quilting frame **12** to be selectively slid along the length of the slotted opening **32***a*, **32***b*. An adjustment mechanism **34** (e.g., conventional fasteners, a friction knob, adjustable screw or the like) may be adjusted in an effort to selectively secure the opposing end plates **24***a*, **24***b* of the quilting frame **12** into a position with respect to the support legs **30***a*, **30***b*. Conversely, the adjustment mechanism **34** may be loosened with respect to its securing engagement between the support leg **30***a*, **30***b* and the end plate **24***a*, **24***b* in order to facilitate a sliding movement in relation to the slotted opening **32***a*, **32***b*, thus providing means for height adjustment of the quilting frame **12** in relation to the

working surface (e.g., table top) **14**. Therefore, the height of the quilting frame **12** (and the corresponding height of the fabric layers **52**, **54** of the quilt being sewn) may be adjusted to an arbitrary height relative to the needle **40** of the sewing machine **20**. To this end, it will be readily appreciated that other adjustment mechanisms may be constructed in accordance with the inventive principles set forth herein. It is intended, therefore, that the examples provided herein be viewed as exemplary of the principles of the present invention, and not as restrictive to a particular structure for implementing those principles.

As discussed hereinabove, the support members **22***a*, **22***b*, **22***c* may selectively engage the locking mechanisms **38***a*, **38***b*, **38***c* disposed at one or both ends thereof. The locking mechanisms **38***a*, **38***b*, **38***c* preferably function to restrict the rotation of the support members to a single direction, thereby providing a means for maintaining tension in the body of the fabric layers **52**, **54**.

In one presently preferred embodiment, each of the locking mechanism **38***a*, **38***b*, **38***c* comprises a ratchet, as best shown in FIGS. **1** and **4**. Each of the ratchets **38***a*, **38***b*, **38***c* preferably comprises a gear **58***a*, **58***b*, **58***c* configured to interlock with a locking member (e.g., pawl) **60***a*, **60***b*, **60***c* disposed in a corresponding location along the length of one or both of the opposing end plates **24***a*, **24***b*, thereby allowing the support members **22***a*, **22***b*, **22***c* to rotate in relation to the opposing end plates **24***a*, **24***b* in a single direction. In this manner, tension may be selectively applied and maintained along the length of the fabric engaging the support members **22***a*, **22***b*, **22***c* in an effort to discourage sagging or slack in the fabric layers **52**, **54** forming the quilt. As appreciated, the locking members **60***a*, **60***b*, **60***c* may be selectively disengaged from their locking engagement with the respective gear **58***a*, **58***b*, **58***c* of each of the support members **22***a*, **22***b*, **22***c* in order to allow the support members to turn freely in either direction. In this regard, fabric may be added or removed along the length of the support members **22***a*, **22***b*, **22***c*.

In one presently preferred embodiment of the present invention, the locking member (e.g., pawls) **60***a*, **60***b*, **60***c* may be connected to the opposing end plates **24***a*, **24***b* by any conventional fastener or other suitable pivot means sufficient to allow the locking member to selectively engage and disengage the respective gear **58***a*, **58***b*, **58***c* of the support member **22***a*, **22***b*, **22***c*. Similarly, the gears **58***a*, **58***b*, **58***c* may be connected to the opposing ends of the support members **22***a*, **22***b*, **22***c* by any conventional fastener sufficient to support a fixed relationship between the end of the respective support member and the gear.

In general, any means capable of selectively locking and unlocking the rotation of the support members **22***a*, **22***b*, **22***c*, including the use of electrical motors, may be employed by the quilting apparatus of the present invention and need not be limited to a ratchet mechanism herein described. To this end, it will be appreciated that other locking mechanisms may be constructed in accordance with the inventive principles set forth herein. It is intended, therefore, that the examples provided herein be viewed as exemplary of the principles of the present invention, and not as restrictive to a particular structure for implementing those principles.

Referring now to FIGS. **1** and **5**, the carriage assembly **18** may be used to maneuver the sewing machine **20** with respect to the fabric layers **52**, **54** forming the quilt and supportably mounted between the support members **22***a*, **22***b*, **22***c* of the quilting frame **12**. Preferably, the carriage assembly **18** is formed of a sufficiently rigid material. For example, the carriage assembly **18** may be formed of metal, wood, ceramic, fiberglass, graphite, any of numerous organic, synthetic or processed materials that are mostly thermoplastic or thermosetting polymers of high molecular weight, with or without additive, such as, plasticizers, auto oxidants, extenders, colorants, ultraviolet light stabilizers, or fillers, which can be shaped, molded, cast, extruded, drawn, foamed or laminated into objects, films, or filament, or any other composite materials or combinations there of which are consistent with the spirit and scope of the present invention.

In one presently preferred embodiment of the present invention, the carriage assembly **18** may include an upper carriage component **42** and a lower carriage component **44** which are capable of manual and/or automated manipulation to facilitate the maneuverability of the sewing machine **20** in both lateral and longitudinal directions **17**, **19** respective to the quilting frame **12**. Consistent with the novel adjustable working components of the quilting apparatus **10** of the present invention, the quilting frame **12** may be supported or mounted on any suitable working surface **14** having an arbitrary length and providing a substantially smooth upper surface. The working surface **14** preferably includes a table top. The longitudinal dimension of the quilting frame **12** may therefore be adjustable to the length of the working surface (e.g., table top) **14**, as desired.

More particularly, in one presently preferred embodiment of the present invention, the carriage assembly **18** is configured to transport the sewing machine **20** of arbitrary throat depth **41** along the length of one or more layers of fabric **52**, **54** comprising the quilt, wherein the quilt has a length which supportably engages the elongated support members of the quilting frame **12** mounted in relation to the working surface (e.g., table top) **14**. The sewing machine **20**, as contemplated herein, may include a wide variety of conventional sewing machines currently available in the marketplace. Functionally, the carriage assembly **18** provides means for moving the sewing machine **20** with respect to the fabric layers **52**, **54**, along both the lateral and longitudinal dimensions thereof, for the purpose of applying stitching, including both patterns and designs, to at least a portion of the body of the quilt.

In certain presently preferred embodiments, the carriage assembly **18** includes an upper carriage component **42** and a corresponding lower carriage component **44**. The lower carriage component **44** may be responsible for selectively transporting the sewing machine **20** along the longitudinal dimension **19** of the quilting frame **12**. With respect thereto, the upper carriage component **42** may preferably move along an upper surface **49** of the lower carriage component **44** and be configured to selectively transport the sewing machine **20** along the lateral dimension **17** of the quilting frame **12**.

As will be appreciated, in one presently preferred alternate embodiment of the present invention, a carriage assembly (not shown) may not include upper and lower carriage components, but rather be formed as a single, unitary member, translatable with respect to both the later and longitudinal dimensions of the quilting frame. Moreover, one or more electric motors (not shown) may be provided in conjunction with the movement of the carriage assembly to facilitate controlled movements of the sewing machine mounted in relation to the carriage assembly.

At least one length of track **21** may be used to retain the carriage assembly **18** properly aligned on the working surface (e.g., table top) **14**. Preferably, two pieces of track

21*a*, 21*b* may be mounted on the working surface **14** in order to restrict the movement of the lower carriage component **44** in a predefined direction along the longitudinal dimension **19** of the quilting frame **12**. In one presently preferred embodiment of the present invention, the track **21***a*, **21***b* may be provided in segments **23***a*, **23***b*, thereby allowing a user to adjust the length of the track according to the corresponding width of the fabric layers **52**, **54** comprising the quilt and/or to fit the length of a working surface (e.g. table top) **14**. The runners **50***a*, **50***b* may be attached to the table surface **14** or working surface **14** by any suitable means, including tape, adhesive, screws, or the like. In addition, a second track **50***a*, **50***b* may be formed along the upper surface **49** of the lower carriage component **44** to guide the upper carriage component **42** in a predefined directional relation thereto. For example, the track **50***a*, **50***b* formed in the upper surface **49** of the lower carriage component **44** may restrict the movement of the upper carriage component **42** to the direction defined by the lateral dimension **17** of the quilting frame **12**. Additionally, the second track **50***a*, **50***b* may comprise end stops or abutments **62** having a dimension sufficient to prevent the upper carriage component **42** from becoming disengaged from its relation to the lower carriage component **44**.

A plurality of rollers (e.g., wheels) **48***a*, **48***b*, **48***c*, **48***d* may be incorporated into the structural design of the lower carriage component **44** for engaging the track **21***a*, **21***b* mounted in relation to the working surface **14**, thus providing means for maneuvering the sewing machine **20** mounted in relation to the carriage assembly **18** in the longitudinal direction **19** of the quilting frame **12**. Similarly, a plurality of rollers (e.g., wheels) **46***a*, **46***b*, **46***c*, **46***d* may be incorporated into the structural design of the upper carriage component **42** for engaging the track **50***a*, **50***b* formed in the upper surface **49** of the lower carriage component **44**, thus providing means for maneuvering the sewing machine **20** mounted in relation to the carriage assembly **18** in the lateral direction **17** of the quilting frame **12**.

In one presently preferred embodiment, the track **21***a*, **21***b* mounted in relation to the working surface **14** may include a guide (e.g., raised rib) **51***a*, **51***b* formed along at least a portion of the length of its upper surface. The rib **51***a*, **51***b* is preferably configured having a dimensional periphery sufficient to engage a recessed portion of the wheels **48***a*, **48***b*, **48***c*, **48***d* of the lower carriage component **44** in a mountable relation thereon. In an alternate presently preferred embodiment, the guide **51***a*, **51***b* may comprise a recess (not shown). The recess may be formed along at least a portion of the length of the upper surface of the track **21**. Preferably, the recess may be configured having a dimensional periphery sufficient to engage a corresponding leading portion of the wheels **48***a*, **48***b*, **48***c*, **48***d* of the lower carriage component **44** in a mountable relation thereto. It will be appreciated that other means for guiding **51** the rollers **46**, **48** of the upper and lower carriage components may be constructed in accordance with the inventive principles set forth herein. It is intended, therefore, that the examples provided herein be viewed as exemplary of the principles of the present invention, and not as restrictive to a particular structure for implementing those principles.

Additionally, the upper carriage component **42** may include one or more handles **64***a*, **64***b* to facilitate an ease in manually maneuverability of the carriage assembly **18** and corresponding mounted sewing machine **20** in the linear and longitudinal directions **17**, **19** of the quilting frame **12** along the tracks **21***a*, **21***b*, **50***a*, **50***b* to stitch or sew patterns or designs in the fabric layers **52**, **54** comprising the quilt.

Referring now to FIGS. **2** and **6**, in one presently preferred alternate embodiment of the present invention, a carriage assembly **118** may not include upper and lower carriage components, but rather be formed as a single, unitary member translatable with respect to both the later and longitudinal directions **17**, **19** of the fabric layers **52**, **54** forming the quilt mounted in relation to the support members **22***a*, **22***b*, **22***c* of the quilting frame **12**. At least one and preferably a plurality of casters **66***a*, **66***b*, **66***c*, **66***d* may be incorporated into the structural design of the carriage assembly **118** for engaging the working surface **14**, thus providing means for maneuvering the sewing machine **20** mounted in relation to the carriage assembly **118** in the lateral and longitudinal directions **17**, **19** of the quilting frame **12**. The carriage assembly **118** may include one or more handles **64***a*, **64***b* to facilitate an ease in manually maneuverability of the carriage assembly **18** and corresponding mounted sewing machine **20** in relation to the fabric layers **52**, **54** forming the quilt. In certain alternate embodiments of the present invention, motors (not shown) may be provided in conjunction with controlling the movement of the carriage assembly **118** relative to the quilting frame **12**. To assist in providing a form of controlled movement, tracks **68***a*, **68***b* may be mounted in relation to the working surface **14** in an effort to restrict the overall maneuverability of the carriage assembly **18** relative to the working surface (e.g., table top) **14** and the quilting frame **12**.

Referring now to one presently preferred method for guiding a sewing machine relative to at least one layer of fabric mounted on a quilting frame, the method comprising the steps of: (1) mounting the quilting frame with respect to the working surface; (2) spooling at least a portion of one or more fabric layers in relation to support members of the quilting frame; (3) paying out the fabric layers in a substantially planar orientation with the quilting frame defined by lateral and longitudinal dimensions, wherein the longitudinal dimension of the quilting frame being selectively adjustable to the length of the working surface; and (4) guiding the sewing machine with respect to the fabric along both the lateral and longitudinal dimensions of the quilting frame by means of a carriage assembly supported by the working surface.

In addition, one presently preferred method of the present invention may comprise the additional steps of adjusting the height of the quilting frame with respect to the working surface and selectively restricting the rotation of the support member of the quilting frame in a single direction to provide a suitable amount of tension in the fabric layers forming the quilt.

In structural design, the various working components of the quilting apparatus are preferably formed of a lightweight polymeric material to facilitate an ease in portability and are configured in such a manner so as to be easily assembled and disassembled for compactibility and storage.

From the above discussion, it will be readily appreciated that the present invention provides a quilting apparatus and methods for using the same having many of the advantages of "long arm" quilting assemblies, while providing a greater degree of simplicity, affordability, and flexibility to a user. In addition, the present invention provides a quilting apparatus that makes use of a sewing machine of arbitrary throat depth being positionable on a carriage assembly and which is capable of providing the sewing or stitching mechanism for the quilt.

Unlike prior quilting assemblies, the present invention provides a quilting apparatus having a quilting frame that is

mountable to a wide variety of ordinary table tops having different dimensions, wherein the quilting frame is adjustable in its overall dimensional width and length with respect to the table top. Similarly, the present invention provides a quilting apparatus that is sufficiently lightweight for portability and collapsible for easy storage.

The present invention may be embodied in other specific forms without departing from its spirit or essential characteristics. The described embodiments are to be considered in all respects only as illustrative, and not restrictive. The scope of the invention is, therefore, indicated by the appended claims, rather than by the foregoing description. All changes which come within the meaning and range of equivalency of the claims are to be embraced within their scope.

What is claimed and desired to be secured by United States Letters Patent is:

1. A quilting apparatus for guiding a sewing machine relative to at least one layer of fabric, the quilting apparatus comprising:

a quilting frame configured to selectively take in and pay out the fabric in a substantially planar orientation defined by lateral and longitudinal dimensions, the quilting frame being mountable with respect to a working surface, and wherein the longitudinal dimension of the quilting frame being selectively adjustable to a length of the working surface; and

a carriage assembly supported by the working surface and configured to selectively transport the sewing machine with respect to the fabric along the lateral and longitudinal dimensions of the quilting frame.

2. The quilting apparatus as defined in claim **1**, wherein the carriage assembly comprises a first carriage component configured to transport the sewing machine along the longitudinal dimension of the quilting frame.

3. The quilting apparatus as defined in claim **2**, further comprising a track configured to mount on the working surface and restrict movement of the first carriage component to the direction defined by the longitudinal dimension of the quilting frame.

4. The quilting apparatus as defined in claim **3**, wherein the first carriage component comprises wheels configured to move along the track.

5. The quilting apparatus as defined in claim **2**, wherein the carriage assembly further comprises a second carriage component supportably mounted in relation to the first carriage component and being movable with respect thereto, the second carriage component configured to transport the sewing machine along the lateral dimension of the quilting frame.

6. The quilting apparatus as defined in claim **5**, wherein the first carriage component comprises an upper surface having a track formed along a length thereof and configured to restrict movement of the second carriage component to the direction defined by the lateral dimension of the quilting frame.

7. The quilting apparatus as defined in claim **6**, wherein the second carriage component comprises wheels configured to move along the length of the track formed on the upper surface of the first carriage component.

8. The quilting apparatus as defined in claim **6**, wherein the track comprises structural stops formed at opposing ends thereof.

9. The quilting apparatus as defined in claim **1**, wherein the quilting frame comprises at least one support member having a length extending along the longitudinal dimension, the support member being configured to act as a spool for storing at least a portion of the fabric thereon, wherein the length of the support member is selectively adjustable to the length of the working surface.

10. The quilting apparatus as defined in claim **9**, wherein the quilting frame further comprises two opposing end plates extending along the lateral dimension, each of the end plates comprising receiving apertures formed therein and at a spaced-apart relationship to each other, wherein the receiving apertures are configured to engageably receive the support members.

11. The quilting apparatus as defined in claim **10**, wherein the end plates are configured having an angular bend formed at one end.

12. The quilting apparatus as defined in claim **10**, wherein the support member comprises opposing ends having a locking member adapted to selectively lock relative to the receiving apertures of the opposing end plates.

13. The quilting apparatus as defined in claim **9**, further comprising a locking mechanism configured to restrict rotation of the support member in a single direction.

14. The quilting apparatus as defined in claim **13**, wherein the locking mechanism comprises a ratchet.

15. The quilting apparatus as defined in claim **1**, further comprising a height adjustment assembly configured to facilitate height adjustment of the quilting frame with respect to the working surface.

16. The quilting apparatus as defined in claim **15**, wherein the height adjustment assembly comprises at least one support leg configured to selectively engage the quilting frame.

17. The quilting apparatus as defined in claim **16**, wherein the support leg comprises a slotted opening.

18. The quilting apparatus as defined in claim **17**, wherein the quilting frame comprises an adjustable mechanism configured to engage the slotted opening of the support leg.

19. A method for guiding a sewing machine relative to at least one layer of fabric mounted on a quilting frame, the method comprising the steps of:

paying out the fabric in a substantially planar orientation with the quilting frame defined by lateral and longitudinal dimensions, the quilting frame being mountable with respect to a working surface, and wherein the longitudinal dimension of the quilting frame being selectively adjustable to the length of the working surface; and

guiding the sewing machine with respect to the fabric along both the lateral and longitudinal dimensions of the quilting frame by means of a carriage assembly supported by the working surface.

20. The method as defined in claim **19**, further comprising the step of spooling the fabric supported by the quilting frame to maintain tension.

21. The method as defined in claim **19**, further comprising the step of adjusting the height of the quilting frame with respect to the working surface.

22. The method as defined in claim **21**, wherein the step of adjusting the height of the quilting frame comprises at least one support leg configured to selectively engage the quilting frame.

23. The method as defined in claim **22**, wherein the support leg comprises a slotted opening.

24. The quilting apparatus as defined in claim **23**, wherein the quilting frame comprises an adjustable mechanism configured to engage the slotted opening of the support leg.

25. The method as defined in claim **19**, wherein the carriage assembly comprises a first carriage component configured to transport the sewing machine along the longitudinal dimension of the quilting frame.

26. The method as defined in claim **25**, further comprising a track configured to mount on the working surface and restrict movement of the first carriage component to the direction defined by the longitudinal dimension of the quilting frame.

27. The method as defined in claim **26**, wherein the first carriage component comprises wheels configured to move along the track.

28. The method as defined in claim **25**, wherein the carriage assembly further comprises a second carriage component supportably mounted in relation to the first carriage component and being movable with respect thereto, the second carriage component configured to transport the sewing machine along the lateral dimension of the quilting frame.

29. The method as defined in claim **28**, wherein the first carriage component comprises an upper surface having a track formed along a length thereof and configured to restrict movement of the second carriage component to the direction defined by the lateral dimension of the quilting frame.

30. The method as defined in claim **29**, wherein the second carriage component comprises wheels configured to move along the length of the track formed on the upper surface of the first carriage component.

31. The method as defined in claim **29**, wherein the track comprises structural stops formed at opposing ends thereof.

32. The method as defined in claim **19**, wherein the quilting frame comprises at least one support member having a length extending along the longitudinal dimension, the support member being configured to act as a spool for storing at least a portion of the fabric thereon, wherein the length of the support member is selectively adjustable to the length of the working surface.

33. The method as defined in claim **32**, wherein the quilting frame further comprises two opposing end plates extending along the lateral dimension, each of the end plates comprising receiving apertures formed therein and at a spaced-apart relationship to each other, wherein the receiving apertures are configured to engageably receive the support members.

34. The method as defined in claim **32**, wherein the support member comprises opposing ends having a locking member adapted to selectively lock relative to the receiving apertures of the opposing end plates.

35. The quilting apparatus as defined in claim **32**, further comprising a locking mechanism configured to restrict rotation of the support member in a single direction.

36. The quilting apparatus as defined in claim **35**, wherein the locking mechanism comprises a ratchet.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 6,615,756 B2
DATED : September 9, 2003
INVENTOR(S) : Laurel W. Barrus

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Title page,
Item [57], **ABSTRACT**, please delete the abstract and replace it with
-- A quilting apparatus and method for guiding a sewing machine relative to at least one layer of fabric is disclosed. The apparatus may include an adjustable quilting frame and a carriage assembly that supports the sewing machine. The quilting frame is mounted relative to a working surface and retains one or more fabric layers in a substantially planar orientation. The carriage assembly includes lower and upper carriage components that cooperate to transport the sewing machine in lateral and longitudinal directions with respect to the quilting frame. The quilting frame includes support members acting as spools to retain the fabric layers and having locking mechanisms for maintaining tension in the fabric layers. The support members have an adjustable length to accommodate various fabric sizes and to accommodate the arbitrary dimensions of the working surface. The height of the quilting frame may also be adjusted by a height adjustment assembly. --

Column 1,
Line 49, please delete “atypical” and replace it with -- a typical --.

Column 15,
Line 23, please delete “being mountale” and replace it with -- being removably mountable --.

Column 16,
Line 40, please delete “being mountable” and replace it with -- being removably mountable --.

Column 18,
Line 20, please delete Claim 35 and replace it with -- The method as defined in claim 32, wherein the quilting frame further comprises a locking mechanism configured to restrict rotation of the support member in a single direction. --.

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

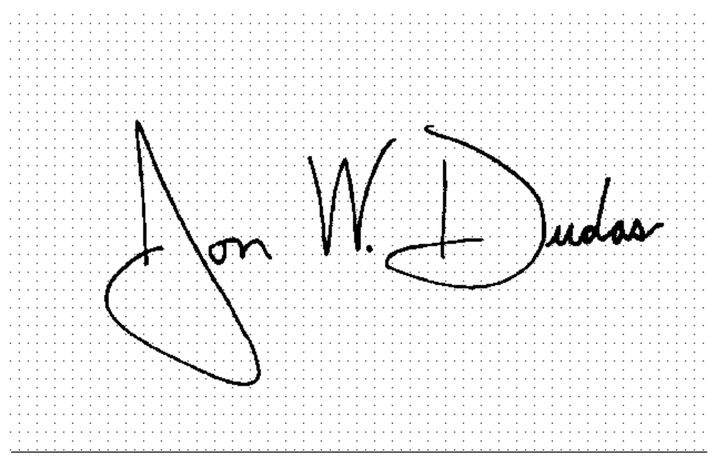
PATENT NO. : 6,615,756 B2
DATED : September 9, 2003
INVENTOR(S) : Laurel W. Barrus

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Column 18 (cont'd),
Line 23, please delete Claim 36 and replace it with -- The method as defined in claim 35, wherein the locking mechanism comprises a ratchet. --.

Signed and Sealed this

First Day of June, 2004



JON W. DUDAS
Acting Director of the United States Patent and Trademark Office